## INCREASING DOMESTIC WOOL PRODUCTION

WOOL CONSUMPTION AND PRODUCTION
IN THE UNITED STATES AND PROGRAMS
NEEDED TO ASSURE HIGH LEVEL WOOL
AND SHEEP PRODUCTION



#### PRESENTED BY MR. O'MAHONEY

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The following report on Increasing Domestic Wool Production is the outgrowth of a number of discussions which I have held with Government officials and other interested persons on the need for a concise statement setting forth the present situation with regard to the consumption and production of wool in the United States, the policies now established to stimulate wool and sheep production and the measures needed if we are to reach the domestic production goals required by our defense needs and our growing economy. The report, which was distributed in preliminary form to key individuals in the wool and sheep industry, has attracted widespread attention and comment and requests for copies have been received from all over the Nation.

When the original document was released I pointed out in an accompanying statement to the press the need for the Department of Agriculture to give wool the same consideration received by other price-supported commodities in the development of its new price-support program. This is necessary primarily because the United States does not now produce sufficient wool even to fill its military needs. If the United States is to have a stable wool crop—and it should have such a crop—the Department of Agriculture should lose no time in establishing a price-support program designed to insure the production of not less than 360 million pounds of shorn wool in this country.

That was the goal established by the O'Mahoney amendment in the Agricultural Adjustment Act of 1949. Wool production in the United States is running far below this level, as is evidenced by the

fact that in 1950 the domestic output amounted to only 252 million pounds, while preliminary figures indicate that the 1951 production, though somewhat over 260 million pounds, will still be far below the

legally established objective.

This goal can be reached without any burden upon consumers. The market for wool and for fabrics made of wool is virtually at a standstill. I have, therefore, asked the Department of Agriculture to expedite the preparation of a new price-support program. To this effect I have suggested that Secretary Brannan reexamine the alternative effects of—

(1) A program based on loans to producers who are holding

their wool for later sale as against

(2) The direct purchase of wool by the Government, and

(3) A combination loan or purchase program which would give the producer some choice in determining whether a loan from, or purchase by, the Government would meet his individual situation and needs.

The Department expects to continue to support the price of wool under the new program beginning in April 1952 at 90 percent of parity. Since over the past 2 years prices have remained above 90 percent of parity, there has been no need for the Government to purchase wool. Many producers feel, however, that if a loan program, such as is in effect for cotton and other commodities, were available for wool it would encourage greater production than support by direct purchase. Government purchase and sale at a low level would, of course, have

the eventual effect of depressing the parity level and would not, therefore, afford the permanent future support which a program for

the stimulation of domestic production sorely needs.

The present study points out a number of additional factors which account for the long decline in sheep and wool production—a trend which was only reversed in 1951. Chief among these are the scarcity and high cost of labor, the fact that the prices of some other livestock have been more favorable than lamb and wool prices, increased production of synthetic fibers, increasing investment required to establish new sheep ranches, and certain range management practices.

A number of means of meeting these difficulties in order to encourage and stabilize production are set forth in the report. Some of these programs are now underway via the Federal and State Governments and individual owners but need to be further developed and intensified to insure the maintenance of high domestic production. In addition to pointing out the need to stabilize and support wool prices at a level which will insure growers a fair and reasonable return compared with alternative farm and range products, the study calls for continued and intensified support of wool and range conservation and other improvement programs on both public and private lands; continuation of efforts to provide qualified and reliable sheep herders and other labor; the intensification of efforts to improve management practices and increase the efficiency of production; development of better marketing practices, including quality standards and testing procedures which will eliminate uncertainty in marketing of wool and increase its acceptability; and expansion of programs for controlling predatory animals.

The report also lists 12 areas for research, such as research on the improvement of breeds to provide better quality and heavier lambs and fleeces; research on the control of poisonous and other noxious weeds; research to determine the carrying capacity of different types

of ranges, etc.

The National Wool Growers Association is presently preparing a program to stimulate the increase of the sheep population and the production of a large wool crop. Others engaged in the production and in the fabrication of wool, including Wool Bureau, Inc. (16 West Forty-sixth Street, New York City), are also giving attention to this matter. It is hoped that the material contained in this study of the problem from the point of view of Government agencies may be helpful

in attaining the desired result.

The study was assembled by the staff of the Joint Committee on the Economic Report from materials prepared by technicians in a number of Government agencies. Special appreciation for major portions of the materials submitted is due to the following persons from the United States Department of Agriculture: Dr. S. O. Fladness, Assistant Chief, Bureau of Animal Industry; Ruth O'Brien, Assistant Chief, Bureau of Human Nutrition and Home Economics; David Beard, Chief, Forage Crops Division, Bureau of Plant Industry; M. O. Cooper, Assistant to the Director of the Livestock Branch, Production and Marketing Administration; J. Murray Thompson, Director of Office of Price, Production and Marketing Administration; H. L. Stewart, Assistant Head, Division of Farm Management and Costs, Bureau of Agricultural Economics; and John Goe, Chief, Wool Division, Production and Marketing Administration.

(Signed) Joseph C. O'MAHONEY.

### INCREASING DOMESTIC WOOL PRODUCTION

#### INTRODUCTION

Twenty years ago the United States produced three-fourths of the wool it consumed. Today in the face of greatly increased consumption of wool, arising out of expanding defense activities, growing population, and high level employment, all of which would naturally be expected to bring about increased production of domestic wool, exactly the reverse has been the case. The production of wool in the Nation, despite the increased demand for wool and wool products, has declined to a point where we now produce only one-fourth of the wool we consume.

For defense reasons alone it is essential that we seek every means of reversing this trend by restoring domestic wool production. As developed by the testimony of Dr. Stephen J. Kennedy, in response to questions propounded by Senator O'Mahoney, the domestic production of wool in the United States is not enough to fill the Nation's

current military needs.

The following report, prepared at the request of Senator O'Mahoney, reviews recent trends and the present status of wool consumption and production in the United States, causes for the decline in production, recent trends in wool prices, Federal and State activities directed toward increased wool production, and points the way to programs needed to assure high level sheep and wool production in the future.

#### TRENDS IN CONSUMPTION AND PRODUCTION

Consumption of wool in the United States in the period 1930–34 averaged 565 million pounds (grease basis) a year. In every year but one since 1940, consumption has been over a billion pounds a year.

Wool production and numbers of sheep, on the other hand, declined from the highest levels on record in 1942 to the lowest recorded levels in 1950. The trend in the number of stock sheep in the United States was generally upward from a level of some 33 million in the mid-twenties to an all-time high of 49 million in 1942. But by 1950, a period of only 8 years, sheep numbers had declined to 27 million although estimates for 1951 show an encouraging reversal of that trend to nearly 32 million.

The production of wool in the United States increased from a level of less than 300 million pounds (grease basis) in the early twenties to a level of 455 million pounds in 1942 and then declined to about 252

¹ Our domestic wool clip "is averaging only about half" the rate of production required for military use during World War II and "the foreign wool which we are using today to supplement our domestic production requires shipping over sea lanes of minimum distances of 5,000 to 8,000 miles. To depend upon imports over extended supply lines in time of war is not realistic." Conservation in Military Textiles, by Dr. Stephen J. Kennedy, Quartermaster Review, November-December 1951.

million pounds in 1950 (table 1). As in the case of sheep numbers, wool production also shows an upturn in 1951 (260 million pounds).

Table 1.—Production of wool, grease basis, in the United States, foreign countries, and the world, by years, 1920-51 1

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					ion of woo		hasis in—			
Year	ediane	Production of wool, grease basis in—  Foreign countries, namely the 5 principal exporting countries						Total foreign,	World	
	United States	Aus- tralia	South Africa	New Zea- land	Argen- tina	Uru- guay	Total for 5 countries	excluding Russia and China	Excluding Russia and China	Including Russia and China
1920	293. 8 290. 2 2770. 4 272. 7 282. 0 300. 0 318. 9 366. 7 382. 3 414. 0 442. 4 447. 5 449. 4 427. 5 449. 4 429. 4 420. 4 420. 4 418. 1 1 438. 4 420. 5 5 6 6 7 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	625. 0 723. 1 726. 7 662. 6 776. 9 833. 7 924. 4 888. 1 968. 2 938. 5 912. 9 1, 007. 5 1, 015. 4 92. 8 1, 023. 4 983. 6 1, 127. 7 1, 141. 8 1, 167. 2 1, 151. 2 1, 151. 2 1, 159. 6 1, 199. 0 1, 016. 5 936. 2 976. 8 1, 019. 0 1, 005. 0 1, 109. 0 1, 100. 0 1, 100. 0 1, 110. 0	182. 0 187. 7 183. 9 198. 1 210. 3 225. 0 260. 1 290. 7 303. 8 305. 0 305. 1 319. 4 275. 2 210. 0 237. 8 248. 0 248. 0 250. 0 25	208. 0 219. 0 246. 0 235. 0 254. 0 235. 0 255. 7 262. 7 262. 7 261. 7 269. 5 277. 1 289. 6 269. 5 277. 1 289. 6 302. 9 310. 0 311. 5 340. 0 351. 0 365. 0 372. 0 365. 0 372. 0 372. 0 372. 0 374. 0	315. 0 316. 0 332. 0 3112. 0 309. 0 322. 0 331. 0 331. 0 331. 0 331. 0 364. 0 364. 0 364. 0 365. 0 374. 0 474. 0 494. 0 510. 0 505. 0 505. 0 505. 0 475. 0 475. 0 471. 0 471. 0 472. 0 473. 0 474. 0 475. 0 4	113. 0 108. 0 96. 0 106. 4 92. 0 115. 5 131. 9 134. 4 151. 1 152. 6 106. 0 110. 2 104. 7 119. 0 116. 3 125. 4 133. 9 139. 0 116. 3 125. 4 139. 0 147. 9 159. 6 175. 2 176. 6 175. 2 176. 6 175. 2 176. 6 176. 7 177. 154. 3 180. 8 180. 8 180. 8 180. 4	1, 443. 0 1, 553. 8 1, 584. 6 1, 514. 6 1, 514. 6 1, 514. 6 1, 514. 6 1, 666. 2 1, 724. 2 1, 881. 1 1, 203. 2 1, 986. 1 1, 971. 1 2, 052. 1 2, 133. 3 2, 029. 4 1, 991. 2 2, 035. 5 2, 035. 5 2, 260. 8 2, 355. 8 2, 257. 8 2, 257	2, 276. 2 2, 369. 8 2, 439. 6 2, 377. 3 2, 538. 0 2, 588. 0 2, 921. 1 2, 933. 3 2, 917. 7 2, 906. 6 2, 924. 5 2, 907. 6 3, 258. 0 3, 258. 3 3, 361. 0 3, 361	2, 570. 0 2, 660. 0 2, 710. 0 2, 820. 0 2, 820. 0 3, 140. 0 3, 140. 0 3, 300. 0 3, 300. 0 3, 300. 0 3, 418. 0 3, 399. 0 3, 488. 0 3, 399. 0 3, 500. 0 3, 685. 0 3, 500. 0 3, 445. 0 3, 500. 0 3, 445. 0 3, 300. 0 3, 445. 0 3, 685. 0 3, 500. 0 3, 445. 0 3, 445. 0 3, 445. 0 3, 300. 0 3, 300	2, 960. 3, 050. 3, 040. 3, 200. 3, 260. 3, 570. 3, 770. 3, 770. 3, 770. 3, 770. 3, 730. 3, 630. 3, 640. 3, 640. 4, 140. 4, 140. 4, 140. 4, 140. 4, 140. 4, 140. 4, 070. 4, 070. 4, 070.

<sup>1</sup> Wool Statistics, table 12, U. S. Department of Agriculture, 1949. <sup>2</sup> Preliminary; from records of the Office of Foreign Agricultural Relations.

#### CAUSES OF DECLINE IN PRODUCTION

Because of the drastic reductions in sheep and wool production, and because of their importance in the defense effort, the Wool Advisory Committee under the Research and Marketing Act of 1946 recommended to the Department of Agriculture that a study be made to determine, among other things, (a) the factors contributing to the decline in wool production, (b) the level at which the sheep and wool producing industry should be maintained in the United States, and (c) what policies should be established to build up and maintain permanently the required wool production on a basis that will encourage the wool grower to invest in the wool-growing business. Pursuant to this recommendation, a study was conducted by the Department of Agriculture, the results of which were published in June 1950.2

Domestic Wool Requirements and Sources of Supply, U.S. Department of Agriculture, June 1950.

The results of the study and of subsequent deliberation indicate that the reduction in sheep numbers from 1942 to 1950 resulted largely from a scarcity of competent herders, increased labor costs, heavy losses from dogs and predatory animals, reductions in grazing allotments on public lands, droughts and poor range conditions in certain areas, low returns from sheep in comparison with those from cattle, marked increases in the investment required to establish or maintain a range-band of sheep, and increased competition from synthetic fibers. Some of these unfavorable factors are still operative but in the past year the returns from sheep and wool in relation to those from cattle have improved and it is expected this will encourage a moderate expansion in sheep numbers in the next few years.

#### RECENT TRENDS IN WOOL PRICES

The Agricultural Adjustment Act of 1949 (Public Law 439, 81st Cong.) provides in title II, section 201, as follows:

(a) The price of wool (including mohair) shall be supported through loans, purchases, or other operations at such level, not in excess of 90 per centum nor less than 60 per centum of the parity price therefore, as the Secretary determines necessary in order to encourage an annual production of approximately three hundred sixty million pounds of shorn wool;

The method of support has been by means of purchases by the Commodity Credit Corporation. In compliance with the Agricultural Act of 1949, the level of support for wool has been set at 90 percent of the March 15 parity, beginning with the 1950 clip. From the average support price for all grades of wool, appropriate price differentials for each grade have been established and made the basis

of purchase schedules.

Wool has been assembled, acquired, stored, and sold for the Government through customary trade channels by wool handlers throughout the country, operating under contract with the Commodity Credit Corporation. Beginning with the 1950 clip year, growers were given an opportunity to delay acceptance or rejection of the Commodity Credit Corporation's offer to purchase, after appraisal, until December 31 of the same year. The only major change made in the 1951 program restricted wool and mohair eligible for sale to the Commodity Credit Corporation to those stocks owned by producers or offered by producers, pools, or cooperative organizations representing producers. The operating program for the 1952 marketing year which begins April 1 is now being developed.

As is indicated in table 2, during 1950 and 1951 the prices received by farmers were above the support levels and, consequently, the sup-

port program was not in active operation.

The legal minimum ceiling price for wool is 90 percent of the price received (by grade) by producers on May 19, 1951, as determined by the Secretary of Agriculture. For all grades sold the average price so determined (90 percent of the price received on May 19, 1951) is 95.4 cents per pound. The December 15, 1951, parity price was 57.1 cents per pound and the actual price received by farmers on December 15, 1951, averaged 62.7 cents per pound (table 2).

Table 2.—Wool: Average prices per pound received by farmers and support prices, 1950 and 1951

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might wife shoulding chast soon bea	19	50	1951		
Period	Support level 1	Average price re- ceived by farmers <sup>2</sup>	Support level 1	Average price re- ceived by farmers <sup>2</sup>	
January	42. 3 42. 3 45. 2 45. 2 45. 2 45. 2 45. 2 45. 2 45. 2 45. 2 45. 2 45. 2	49. 6 50. 8 52. 4 53. 2 55. 6 58. 6 60. 4 65. 6 69. 0 74. 5 82. 8	45. 2 54. 2 45. 2 50. 7 50. 7 50. 7 50. 7 50. 7 50. 7 50. 7 50. 7	98. 0 109. 0 119. 0 113. 0 106. 0 101. 0 86. 5 77. 1 66. 9 65. 9 65. 7 62. 7	
Weighted average		57.3		(3)	

190 percent of the Mar. 15 parity price.
 2 Source: Bureau of Agricultural Economics. Preliminary.
 3 Average price not available until 1952.

Dollars-and-cents ceiling prices for sales, by sellers other than growers, of greasy wool, original bag mohair, and mohair matchings, and for all sales of scoured wool, wool top, wool noils, mohair top, mohair noils, alpaca fleece, alpaca top, and alpaca noils were established on May 19, 1951, by CPR 35. On January 9, 1952, CPR 35 Revised was issued to be effective April 8, 1952, which reduces the ceiling for these commodities by about 20 percent, according to the Statement of Considerations issued in connection with this revision. The 90-day period between the issuance of the revised regulation and its effective date was to afford an opportunity for the orderly completion of most existing contracts made at the higher price levels originally established in Ceiling Price Regulation 35. The raw-wool prices listed in the revised regulation are equivalent to somewhat more than 150 percent of the current parity price for wool and, therefore, substantially above the current market for wool and related fibers affected.

#### FEDERAL AND STATE PROGRAMS DIRECTED TOWARD INCREASED SHEEP AND WOOL PRODUCTION

There are a number of programs already under way which are directed all or in part toward increasing the production of wool. Some of these programs have been in operation with varying resources and success for a number of years, some are designed to aid in solving problems which have developed more recently, and still others are not expected to be directly felt for several years. An examination of all of the programs will indicate the kind of problems on which Federal and State assistance is needed and can be most effective.

1. Soil and range conservation program.—The agricultural conservation program has assisted farmers and ranchers in conserving and improving their range land, by sharing the cost of carrying out essential conservation practices. Range lands have been made much more productive by improving pastures and range through seeding and reseeding, providing adequate stock-water developments so that proper distribution of grazing can be obtained, by control or eradication of competitive plants, and other approved conserving measures. Table 3 shows a few of the accomplishments under the agricultural conservation program during the period 1936–49 in 17 Western States. In this area about 650,000 developments have been installed to provide water for livestock, thereby permitting better distribution of grazing of range lands. Over 18 million acres of range and pasture have been improved by seeding and reseeding to improve grasses and forage, thereby increasing the carrying capacity as well as providing a protective cover for the land. Much land that has been overgrown with brush and other competitive plants has been made available for grazing by eradicating or controlling such growth. Over 23 million acres of such land have been so treated in the 17 Western States.

Table 3.—Some of the conservation measures which have been carried out under the agricultural conservation program in 17 Western States during the period 1936-49, and the estimated amounts still needed

State	All stockwater developments		Pasture and range seeding			on of com- plants on age	Construction of supplemental stockwater storage	
	1936–49 accom- plish- ments	Amount still needed	1936-49 accom- plish- ments	Amount still needed	1936-49 accom- plish- ments	Amount still needed	1936-49 accom- plish- ments	Amount still needed
Arizona California Colorado Idaho Kansas Montana Nebraska New Mexico North Dakota Oklahoma Oregon South Dakota Texas Utah Washington Wyoming California California Colorado California Colorado California Califo	Number 8, 254 10, 679 17, 595 3, 204 30, 960 41, 187 49, 642 1, 665 23, 166 18, 146 83, 852 6, 680 81, 789 2226, 618 9, 313 1, 923 33, 863	Number 21, 750 48, 000 25, 000 14, 465 57, 050 69, 000 44, 200 44, 005 51, 927 21, 632 69, 500 188, 200 12, 404 37, 600	Acres 33,711 729,666 727,990 425,015 783,309 1,711,700 1,711,700 1,465,027 88,616 100,529 1,588,921 1,769,020 1,106,631 1,923,291 1,923,291 3,835,139 3,835,139 3,835,139 3,835,330	Acres 1, 990, 000 7, 970, 000 6, 000, 000 3, 810, 500 6, 380, 000 7, 000, 000 1, 115, 246 7, 100, 000 7, 742, 009 4, 050, 000 7, 742, 009 13, 598, 500 3, 575, 000 2, 463, 393 9, 178, 000	Acres 104, 432 133, 645 126, 323 19, 119 493, 722 25, 484 1, 680 1, 391, 135 1, 297 468, 133 32, 338 20, 648, 467 152, 378 45, 372 58, 497	Acres 3, 279, 000 1, 183, 500 3, 460, 000 1, 450, 000 1, 500, 000 200, 000 1, 081, 200 6, 000, 000 350, 000 4, 350, 000 2, 190, 000 2, 190, 000 2, 673, 000 4, 350, 000 4, 350, 000 4, 350, 000	Number 585 1, 047 1, 444 231 318 90 3, 223 25	Number 4,000 7,000 6,000 744 6,500 3,000 10,000 15,000 15,000 15,000 15,000 13,200 13,200 15,000 15,000
Total	648, 536	792, 433	8, 472, 998	96, 277, 326	23, 705, 892	79, 397, 700	9, 188	106, 983

Source: ACP Branch, PMA, November 1951.

Another part of the program is the production of adequate quantities of grass seeds. The Department issued 1952 production guides for a number of the important legume and grass seeds. The 1952 production guides for hay, pasture, and range grass seeds are based on the assumption that domestic seed requirements will be at higher levels than in 1951. Some of the acreage used for production of grass seeds provide excellent pasture for grazing sheep during several months of the year.

Seed producers are being assured of fair prices through Commodity Credit Corporation price-support programs, which are designed to encourage production to meet the requirements for improving hay, pasture, and range acreages. In 1951 farm and warehouse loans and purchase agreements were made available by the Commodity Credit

Corporation to producers of 40 different hay, pasture, and range grass seeds. The level of price support for these seeds generally ranges between 60 and 90 percent of parity depending upon the supply, demand, and need to encourage increased production with particular

emphasis put on the production of improved varieties.

The production guides, price support, and related conservation programs have materially increased the use of these seeds for improving hay, pasture, and range lands. The planting of the 12 most important legumes in the United States has increased 40 percent during the past 10 years (1941 compared with 1951) and for the period 1941-51 grass-seed utilization and production increased about 15 percent. Since the production of grass seeds varies widely from year to year the price-support programs have also been needed in building reserve stocks to maintain a normal supply.

2. Administration of public lands to maximize and stabilize production.—The Federal Government is also applying conservation practices and programs to the public lands in an effort to restore and increase

their productivity.

The Bureau of Land Management is reseeding public-domain ranges at an average annual rate of about 40,000 acres, but they estimate that some 22 million acres need revegetation.3 They estimate also that a gross area of 17 million acres of public doman range land has been given only a partial conservation treatment, and that 100 years would be required to complete the job at current rates of operation.

The Forest Service has reseeded about 400,000 acres of deteriorated range lands. Four million acres of national forest ranges can and should be reseeded to increase their forage production within a reasonable time.4 There are some national forest allotments suitable for sheep grazing, particularly in the northwest and northern regions, that have lain idle because of lack of demand for them. On some, costs of operation are higher than average but better profits would encourage their use.

3. Provision of adequate and efficient labor.—The Farm Placement Service is attempting to fill orders for sheep herders and other labor as the need arises but qualified and dependable sheepmen are scarce. Public Law 587, Eighty-first Congress, has helped to alleviate, temporarily at least, the scarcity of qualified herders in the West. Over 400 Basque herds were brought into this country in late 1950 and early

1951 under the provisions of this law.

4. Improvement of production practices and the efficiency of production.—During the period 1942-46, when sheep production and numbers were 60 percent greater than today, sheep consumed only about 7 percent of all livestock feed. Nearly 90 percent of the sheep's ration is pasture and hay. From the standpoint of feed supplies for sheep, it is obvious that anything done to increase and stabilize forage production will likewise benefit sheep production.

No other class of livestock depends upon pasture for feed to the extent that sheep do. Much of this pasture used by sheep is native range and other grazing land on which intensive management is not practiced. Year to year feed supplies fluctuate from less than 25 to 100 percent of capacity. Without ample feed reserves to maintain optimum numbers of animals, losses in gain, quality of product, and

Rebuilding the Federal Range, Bureau of Land Management, 1951.
4 1950 report of the Chief of the Forest Service.

death of sheep results. Lamb survival is often below a profitable level due to inadequate feed for the breeding flock.

The range studies of the Department of Agriculture are yielding

The range studies of the Department of Agriculture are yielding results on rate of stocking and range management which will enable range sheepmen to obtain maximum yields of wool and lamb compatible with maintenance and improvement of the range.

With a good grazing program, winter-feed supplies remain the problem. In some areas winter range may be adequate, though far from desirable. Hay harvested from irrigated meadows is often far short of the demand. Research of the Department of Agriculture indicates that hay production of irrigated mountain meadows can be increased 50 to 100 percent by proper fertilization, watering, and use of adapted seeding mixtures. With a larger quantity of winter feed provided by fewer acres of these properly managed meadows, it will be possible to make use of the remaining acreage for supplemental grazing to relieve the pressure on the ranges. Improved pastures on both irrigated and nonirrigated land are another possible source of feed to supplement the native range.

Basic studies on forage digestion by sheep, studies of nutrients needed, to supplement winter forage, of cobalt, copper, and other trace mineral nutrients, and the use of byproduct feeds are also under way, aimed at the improvement of efficiency of production and quality of lambs produced.

5. Improvement of breeds.—The Bureau of Animal Industry has for many years done research on the improvement of range and farm sheep with respect to amount and quality of meat and wool production. On western ranges the program is directed toward improvement of white-face types of sheep, while in the eastern United States emphasis is on improvement of dark-face, mutton types, and Merinos. This research has resulted in the development of the Columbia breed, a large sheep, shearing heavy fleeces of %-blood wool. The Columbias wean heavy lambs, a large proportion of them ready for slaughter off the ewe under good range conditions in the northern range area. The Bureau is developing another breed, the Targhee, at its Range Sheep Experiment Station at Dubois, Idaho. The Targhee is slightly smaller than the Columbia. Targhees shear heavy halfblood fleeces and wean heavy lambs though these are generally a little smaller than the Columbia.

In cooperation with the 11 Western States and Texas, the Bureau of Animal Industry is improving the basic range breed, the Rambouillet, for reduced face cover, lamb production, wool quality, and wool production. Open-faced Rambouillets have weaned about 11 pounds more lamb per ewe than wool-blind ewes. The Bureau has developed a Rambouillet breeding flock at Dubois, noted for its ability to transmit productivity and quality. Studies on the Rambouillet, Columbia, and Targhee are contributing substantially to our basic knowledge of the genetics of sheep. These studies are producing information of value on the production of all breeds of sheep.

6. Improvement of disease control.—Internal parasites are a serious and widely distributed hazard to profitable sheep production. Nematodes or roundworms, which occur in the stomach, intestines, and lungs, retard weight gains, injure the wool, and cause sickness and death. In acute outbreaks of parasitism in feedlots, death losses may amount up to 30 percent, and the delay required to bring the survivors up to minimal finish for market may be even more costly.

The most powerful, practical weapons against these devastating marauders are a few antiparasitic chemicals, the most notable remedy being phenothiazine, the curative action of which was discovered in the Bureau of Animal Industry in 1938. A period of general administration of this drug in salt preceded by a treatment of the entire flock with a curative dose of the chemical, is now almost universally relied upon by sheepmen to prevent or minimize parasitism on their flocks. Concerning other parasites, such as liver flukes, tapeworms, and coccidia, which do not respond to treatment with phenothiazine, reasonably effective control measures are being developed and recommended by the Bureau.

Sheep scabies, also known as mange and common scab, is a highly contagious and destructive disease which has been a serious economic factor in the production of sheep and wool, and so long as the disease exists anywhere in the country constitutes a threat to the industry. It is caused by an external parasite known as the scab mite. This parasite causes the formation of crusts or scabs on the skin which is destructive of the fleece. There is intense itching, causing the sheep to scratch and rub against trees, posts, or other similar objects, thereby producing a very unthrifty condition. In extreme cases there is a general toxemia, resulting in death.

Early in this century, sheep scab was prevalent all over the western range country. About 1905 an active campaign to eradicate it was undertaken by the Bureau of Animal Industry in cooperation with the various States involved. By 1935 the disease had been completely eradicated in the entire range country, but in the meantime, through normal west-to-east movements, had invaded the farm States of the Mississippi and Ohio River Valleys. In those areas complete eradication has not yet been achieved. During the past 2 years there has been a demand in the western regions for sheep to supplement their flocks, and some purchases have been made in areas where infestation still exists. This has resulted in the reappearance of sheep scab in several of the far Western States which otherwise have been free for a great many years. Each of these reinfestations has been successfully eradicated, but the threat remains.

7. Control of predatory animals.—The Fish and Wildlife Service, in cooperation with the various State game commissions, is actively engaged in the control of predatory animals. New poisons and other control measures have been developed and their application has greatly reduced the numbers of coyotes in some of the open-range areas of the West. Control of other predatory animals in the West has been less successful and losses by dogs continue to be a problem in the native sheep States.

8. Improvement of marketing practices.—Wool is a highly variable product. Most growers sell on a grease basis with only a judgment as to the amount of clean wool involved after the grease and foreign material have been removed. Their judgment, upon which they must depend, is even less adequate for a determination of quality. As a result they do not have sufficient information to meet wool buyers on even terms and their wool often is marketed in lots of mixed qualities which detracts from its acceptability and adds to its processing costs.

The Department of Agriculture has developed and is using a procedure for sampling and testing wool for shrinkage (clean content).

In cooperation with the western State agricultural experiment stations, the Department also is attempting to determine the economic feasibility of improved preparation of clips and best method of sale in an effort to increase the acceptability of the wool and the return

to the producers.

9. Provision of statistics and analyses of current and prospective production, costs, supplies, demand and prices.—The Department of Agriculture is continuously providing growers, processors, and consumers with statistics on current production, costs, supplies, and prices of sheep and wool, and of the various factors required in their production. In its work on agricultural outlook its wool and livestock and meat "situation" reports, and in periodic analyses of the price-making forces which determine the demand and price of wool,5 it provides analysis of production demand and prices which serve as guides for both producers and processors in planning their operations. Still another service of the Department of Agriculture to sheep and

wool growers is its series of continuing studies made in cooperation with the State agricultural experiment stations of the costs and returns incurred annually by typical sheep ranches. Such studies are being made currently in the Intermountain Region and in the Northern

Great Plains.6

10. Research dealing with wool processing.—Increased returns to wool growers, as well as the conservation of a limited supply of domestic wool, could be furthered also by improvements in its processing, but a better understanding of its basic characteristics, and by the development of physical or chemical means of improving those characteristics which in turn would improve its usefulness. The Bureau of Agricultural and Industrial Chemistry is working on improved methods of scouring grease wool under conditions which will minimize damage to the wool fiber. It also is conducting basic research designed to provide both a better understanding of the wool fiber and possible physical or chemical means of improving it.

11. Research dealing with wool utilization.—In addition to its activities, which pertain to the production, marketing and processing of wool, the Department of Agriculture is developing information which will assist consumers in the selection, use, and care of clothing

and household textiles.78

The present wool situation is resulting in significant changes in the composition of household textiles formerly made largely of wool, such as carpets and rugs, and wool clothing for civilian use. Manufactured fibers—the rayons and synthetics—are being substituted for wool in all of these articles, and wools coarser than those used formerly are being incorporated in some apparel fabrics.

These substitutions pose serious problems from the standpoint of

consumer use, such as-

1. How will the durability of an apparel fabric or a carpet be affected by substitution of rayon or synthetic fiber for all or part of the amount of wool formerly used in such constructions?

2. How much wool can be replaced by these manufactured fibers without altering materially the warmth, resilience and ap-

<sup>&</sup>lt;sup>8</sup> Prices of Apparel Wool, U. S. Department of Agriculture, Tech. Bull. No. 1041, October 1951.
<sup>6</sup> Commercial Family-Operated Sheep Ranches, Northern Great Plains Region, 1930-50, Organization, Production Practices, Costs, and Returns, Mont. Agr. Expt. Sta. Bull. 478.
<sup>7</sup> Buying Men's Suits, U. S. Dept. of Agriculture, Misc. Pub. No. 688, September 1949.
<sup>8</sup> Mending Men's Suits, U. S. Dept. of Agriculture, Misc. Pub. No. 482, January 1946.

pearance as well as the wearing quality of the major types of fabrics?

3. For what purposes will fabrics made wholly or in part from lower grade wool and from manufactured fibers be satisfactory in consumer use?

The answer to these and similar questions can be obtained only by a systematic-research program in which fabrics of different composition, made under research conditions with all variables carefully controlled, are subjected to laboratory and in-use studies but to date, few such researches have been made.

The Bureau of Human Nutrition and Home Economics has a study in progress, in which manufactured fibers have been substituted for part of the wool in a clothing fabric. A few whipcord suitings have been made containing medium and coarse wools (56's to 58's and 48's to 50's, respectively) of known genetic origin in combination with different amounts of staple nylon and rayon. These fabrics are being subjected to wear in a controlled study from which data will be obtained on their relative resistance to normal service.

#### PROGRAMS FOR ENCOURAGING INCREASED SHEEP AND WOOL PRODUCTION

As can be seen from the foregoing review of existing Federal and State programs, much work is now being done to raise the level of domestic wool production but some of this work needs to be carried out on a larger scale. In addition, there are a number of other steps which can be taken by both government and individuals to encourage further increases in production. The Wool Advisory Committee in its report on Domestic Wool Requirements and Sources of Supply indicated that stock sheep numbers could be increased to about 37 million head with proper use of forage resources and production balanced with other livestock. Such a level of sheep population would provide for an annual production of about 335 million pounds of wool (grease basis). The attainment of this increase; however, will require the use of all available means for raising production including:

1. Continuation of support prices for wool.—Returns from sheep and wool compared with those from cattle have improved somewhat in 1951, but they remain relatively unfavorable. It is believed that numbers of sheep have been increased moderately during 1951 but wool growers cannot be expected to meet our needs for domestic wool if returns from alternative enterprises are more favorable than those from sheep and wool.

2. Intensification of soil and range conservation programs on both public and private lands—in order to maintain and improve carrying capacities, reduce death losses, and increase both the size of lamb crops and the marketing weights of lambs and wool.—Substantial progress has been made in this field by the Federal agencies and by the wool growers themselves, but a great deal more needs to be accomplished. Some 82 percent of the public-domain range is still eroding and opportunities to increase livestock on much of this land are diminishing.

3. Widening efforts to provide sheep producers with adequate numbers of qualified and reliable sheep herders and other labor, and providing other means of alleviating the labor problems of sheep producers.—The Farm Placement Service is attempting to fill orders for herders and other labor as the need arises, but qualified, dependable sheep men

are scarce. Importation of Basque herders has been helpful but concerted action on the part of a substantial number of operators has been required to bring in such herders and, as a result, individual

operators are unable to secure herders as the need arises.

4. Development of more effective means of controlling predatory animals.—The development of new poisons and other control measures, and their application by the Fish and Wildlife Service, the reduced the numbers of coyotes in many of the open-range areas of the State game commissions, and the livestock producers have greatly West. But in other areas more intensive application of known control measures is needed, and more effective control measures for other predatory animals should be developed. In the native sheep States more effective measures must be found for reducing losses by dogs. The development of model dog laws which, if enacted and enforced by the States and local governments, would tend to reduce losses of sheep, is needed.

5. Improvement in production practices and the efficiency of production.—Much of the wide variation between individual sheep producers in the size of their lamb crops, amount of death losses, and weight of lambs and fleece marketed is due to variations in the extent to which they have adopted improved management practices which already are known. The operators who have adopted improved management practices are producing more lamp and wool per ewe than are those who have not adopted such practices. More intensive efforts should be made to determine the effect of various improved practices on operators' costs, production and income under actual farm and ranch conditions, and in the dissemination of such information to wool

rowers.

6. Improvement in wool marketing practices in order to increase the acceptability to processors of our domestic wool, reduce processing costs, and increase the returns to wool growers.—Needed too are more intensive efforts to determine how and where marketing practices can be improved and made more efficient.

7. Development of the research background which is required to strengthen and stabilize the domestic sheep industry.—Many of these projects are directly related to the above programs but are listed together because they each represent some kind of needed research.

Research is needed to-

(a) Determine the costs and the economic feasibility of various improved production practices, obstacles to increased production, means of encouraging production, the place of the sheep enterprise in farming systems in different areas of the country, the areas where increased production is most feasible, and the special problems of credit and financing of sheep operators. The development of farm flocks in some of the new irrigation areas of the Great Plains appears to be one of the more promising areas for increasing wool production, but research is needed to demonstrate to new settlers the feasibility and the profitableness of the sheep enterprise, and to determine means of overcoming obstacles to the development of farm flocks in such areas.

(b) Improve breeds to provide better-quality and heavier lambs and fleeces. It is especially important that the desired fleece characteristics be combined in predictable fashion with

fecundity, hardiness, and the ability to produce fast-growing lambs ready for market off the ewe. Research is needed to enable sheepmen to produce fall lambs by out-of-season breeding through use of hormones or altered management practices, a most uncertain business at present. We need to know how to control harshness in wool fiber, how most effectively to use various existing kinds of wool in fabrics and felts and to determine on an individual fleece basis which fleeces are best suited to particular uses so that we may use such information to guide our selective breeding. Even more important, perhaps, is the need for more basic knowledge of the nutritive requirements of sheep and of digestive physiology so that we can enable farmers and ranchers to produce more wool and lamb from each unit of feed.

(c) Control poisonous and other noxious weeds.

(d) Develop improved forage species to provide more and better quality feeds over long grazing periods, and improved pastures to supplement native ranges. Especially needed in the range States where about three-fourths of our wool is produced, is a forage legume which is adapted to the area and to grazing by livestock.

(e) Improve feeding practices.

(f) Determine the effects of varying rates of stocking on the carrying capacity of different types of ranges. Part of the need here is for an intensification of the physical research now underway which will enable sheep men to obtain maximum yields and quality of wool and lamb compatible with the maintenance and improvement of their production resources. Range studies to determine the effect of various rates of stocking on production and on the carrying capacity and the quality of the range should be extended to other areas. Basic studies of more effective means of determining and supplementing mineral deficiencies need to be extended.

(g) Develop improved and more economic methods of reseeding

and restoring depleted ranges.

(h) Improve methods of detecting and controlling livestock

diseases.

(i) Develop satisfactory classifications and specifications for the various quality characteristics of wool, and practical and objective methods of sampling and testing by wool growers for both quality and quantity.

(j) Analyze the price-making forces which determine the

demand price of wool.

(k) Provide the growers, the processors, and the consumers with better statistics on current and prospective production,

costs, supplies, demand, and prices.
(l) Provide consumers with information which will assist them in the selection, use and care of clothing and household textiles, including information on the effects of substituting lower grade wools and synthetic fibers for the wools formerly used in the construction of textiles.